PACIFIC GAS AND ELECTRIC COMPANY
Wildfire Mitigation Plans Discovery 2023
Data Response

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Date Sent:	May 19, 2023	Requesting Party:	Office of Energy Infrastructure Safety
DRU Index #:		Requester:	Colin Russell Lang

SUBJECT: REGARDING RSE (RISK BUY-DOWN) INFORMATION REQUIRED BY THE WMP GUIDELINES

QUESTION 011

The 2023-2025 WMP Guidelines make specific requests for RSE, optimization of risk reduction and cost, and prioritization decisions:

7.1.4.1 Identifying and Evaluating Mitigation Initiatives

(a) The procedures for identifying and evaluating mitigation initiatives (comparable to 2018 S-MAP Settlement Agreement, row 26), including the use of risk buy-down estimates (e.g., risk-spend efficiency) and evaluating the benefits and drawbacks of mitigations.

7.1.4.2 Mitigation Initiative Prioritization

(b) Explain how the electrical corporation is optimizing its resources to maximize risk reduction. Describe how the proposed initiatives are an efficient use of electrical corporation resources and focus on achieving the greatest risk reduction with the most efficient use of funds and workforce resources.

(c) The electrical corporation must describe how it prioritizes mitigation initiatives to reduce both wildfire and PSPS risk. This discussion must include the following:

    (i) A high-level schematic showing the procedures and evaluation criteria used to evaluate potential mitigation initiatives. At a minimum, the schematic must demonstrate the roles of quantitative risk assessment, resource allocation, evaluation of other performance objectives (e.g., cost, timing) identified by the electrical corporation, and SME judgment.

PG&E does provide a graph of HFRA WDRM v3 System Hardening Buydown; Figure 6.6.1-1, but the detail provided does not allow an evaluator to reconcile with content from section 7 and it is also missing important components of RSE. In particular, a detailed description of RSE (the risk buy-down process) is needed to reconcile with the information provided in tables 7-2 and 7-4. Please complete the following, including via Excel file as applicable:

Mitigation (reference Section 2, Table 7-3-1)	Initiative Tracking ID	WMP Category	Circuit Segments Impacted (reference Table 7-2)	Estimated Risk Reduction	Estimated Cost	RSE: (Risk Reduction/ Cost)

a. Provide RSE (Risk buy-down) information in a new RSE table as follows, ranked in descending order of RSE.

b. Update Table 7.4 to cross-reference the new RSE table. This can be completed by adding an index number to each Mitigation initiative, where the index number is the RSE rank of the initiative from the RSE table.

c. Add a narrative explanation of how the RSE table informed the mitigation decisions, in particular where lower ranked RSE mitigations were approved over higher ranked ones.

ANSWER 011

a. PG&E met with Energy Safety to discuss this data request on May 11, 2023. During that meeting, PG&E confirmed that "RSE" and "risk buydown" are distinct terms with different meanings. In its request, Energy Safety used the term "RSE" to describe the calculation of the total risk reduced divided by the cost of the mitigation in a given year. PG&E discussed how this version of RSE considers risk reduced for one year, but it does not take into account the length of each mitigation's benefit life. PG&E agreed to provide RSEs using Energy Safety's definition by aggregating the risk reduction from the work completed from 2023-2025 and dividing by the total cost from 2023-2025. These RSEs are incorporated into the chart below. PG&E notes that the definition of RSE used for purposes of this request is not the same as the regulatory definition of RSE from the S-MAP Settlement Agreement. "Risk buydown" refers to the total risk reduction from investment in a particular mitigation. The chart below ranks mitigations by their estimated total risk reduction (Risk Buydown).[1]

   As part of the meeting with Energy Safety, PG&E agreed to identify the circuits segments impacted from among the top 41 risk segments identified in the 2023-2025 WMP in Tables 7-2 and 7-4. PG&E is unable to isolate the costs for each mitigation for work only on the 41 circuit segments. Therefore, the costs and the RSEs identified in the table below reflect the total program costs and total number of circuit segments in HFTD.

[1] Risk reduction information was provided in 'Data_RR' in '2023-04-06_PGE_2023_WMP_R2_Section 6.4.2_Atch01.xlsx'. Estimated costs are provided as part of the Quarterly Data Report.

Mitigation (Reference Section 2, Table 7-3-1)	Initiative Tracking ID	WMP Category	Circuit Segments Impacted (Reference Table 7-2)	Est. Total Risk Reduction (Risk Buydown)	Estimated Total Cost ($000s)	RSE: (Risk Reduction/ Cost $M)	RSE Rank
10K Undergrounding	GH-04	Grid Design, Operations and Maintenance	BONNIE NOOK 1101CB, ALLEGHANY 1102CB, HIGHLANDS 1102628, UPPER LAKE 11011276, MIDDLETOWN 110148212, APPLE HILL 21026552, CLAYTON 221296224, BUCKS CREEK 1101CB, APPLE HILL 1104CB, TIGER CREEK 0201CB	2,321.04	$4,756,615	487.96	8

Mitigation (Reference Section 2, Table 7-3-1)	Initiative Tracking ID	WMP Category	Circuit Segments Impacted (Reference Table 7-2)	Est. Total Risk Reduction (Risk Buydown)	Estimated Total Cost ($000s)	RSE: (Risk Reduction/ Cost $M)	RSE Rank
Non-Pole Backlog (Part of HFTD/HFRA Open Tag Reduction – Distribution Backlog)	GM-03	Grid Design, Operations and Maintenance	INDIAN FLAT 1104CB, BONNIE NOOK 1101CB, ALLEGHANY 1102CB, OAKHURST 110310140, SILVERADO 2104515946, HIGHLANDS 1102628, UPPER LAKE 11011276, APPLE HILL 21026552, NOTRE DAME 11042028, CLAYTON 221296224, ANTLER 11011384, MONTICELLO 1101654, BALCH NO 1 1101105414, CURTIS 170356972, MONTICELLO 1101630, PINE GROVE 1101CB, SILVERADO 2104646776, CALISTOGA 1102131531, APPLE HILL 1104CB, MIDDLETOWN 1101171414, ELECTRA 1102CB, ORO FINO 1102CB, FRENCH GULCH 1101CB, CRESTA 1101103126, CRESTA 1101546650, MONTICELLO 1101CB, APPLE HILL 2102CB	839.02	$415,498	2,109.35	5

Mitigation (Reference Section 2, Table 7-3-1)	Initiative Tracking ID	WMP Category	Circuit Segments Impacted (Reference Table 7-2)	Est. Total Risk Reduction (Risk Buydown)	Estimated Total Cost ($000s)	RSE: (Risk Reduction/ Cost $M)	RSE Rank
EPSS - Down Conductor Detection (DCD)	GM-06	Grid Design, Operations and Maintenance	OAKHURST 110310140, HIGHLANDS 1102628, APPLE HILL 21026552, NOTRE DAME 11042028, ANTLER 11011384, MONTICELLO 1101654, BALCH NO 1 1101105414, MONTICELLO 1101630, MIDDLETOWN 1101171414, CRESTA 1101103126, CRESTA 1101546650	489.88	$37,440	13,084.35	2
Overhead Hardening (Part of System Hardening – Distribution)	GH-01	Grid Design, Operations and Maintenance	HIGHLANDS 1102628, UPPER LAKE 11011276, MIDDLETOWN 110148212, CLAYTON 221296224, BUCKS CREEK 1101CB	237.48	$168,238	1,411.57	6
Line Removal (Part of System Hardening – Distribution)	GH-01	Grid Design, Operations and Maintenance	BONNIE NOOK 1101CB, ALLEGHANY 1102CB, HIGHLANDS 1102628	206.25	$7,523	27,415.72	1
Non-Exempt Expulsion Fuse - Removal	GH-10	Grid Design, Operations and Maintenance	BONNIE NOOK 1101CB, CLAYTON 221296224, MONTICELLO 1101630, CALISTOGA 1102131531	162.28	$70,607	2,298.42	4

Mitigation (Reference Section 2, Table 7-3-1)	Initiative Tracking ID	WMP Category	Circuit Segments Impacted (Reference Table 7-2)	Est. Total Risk Reduction (Risk Buydown)	Estimated Total Cost ($000s)	RSE: (Risk Reduction/ Cost $M)	RSE Rank
Tree Removal	VM-04	Vegetation Management and Inspection	BONNIE NOOK 1101CB, OAKHURST 110310140, SILVERADO 2104515946, UPPER LAKE 11011276, MIDDLETOWN 110148212, APPLE HILL 21026552, CLAYTON 221296224, CALISTOGA 1102131531	109.72	$155,303	706.50	7
HFTD/HFRA Open Tag Reduction - Transmission	GM-02	Grid Design, Operations and Maintenance	This mitigation does not impact the circuits listed on Table 7-2	78.58	$444,927	176.61	11

Mitigation (Reference Section 2, Table 7-3-1)	Initiative Tracking ID	WMP Category	Circuit Segments Impacted (Reference Table 7-2)	Est. Total Risk Reduction (Risk Buydown)	Estimated Total Cost ($000s)	RSE: (Risk Reduction/ Cost $M)	RSE Rank
Pole Backlog (Part of HFTD/HFRA Open Tag Reduction – Distribution Backlog)	GM-03	Grid Design, Operations and Maintenance	INDIAN FLAT 1104CB, BONNIE NOOK 1101CB, ALLEGHANY 1102CB, OAKHURST 110310140, HIGHLANDS 1102628, UPPER LAKE 11011276, APPLE HILL 21026552, NOTRE DAME 11042028, CLAYTON 221296224, ANTLER 11011384, MONTICELLO 1101654, BALCH NO 1 1101105414, MONTICELLO 1101630, PINE GROVE 1101CB, SILVERADO 2104646776, CALISTOGA 1102131531, APPLE HILL 1104CB, MIDDLETOWN 1101171414, ELECTRA 1102CB, ORO FINO 1102CB, FRENCH GULCH 1101CB, MONTICELLO 1101CB, TIGER CREEK 0201CB	49.90	$489,650	101.90	14
System Hardening - Transmission	GH-05	Grid Design, Operations and Maintenance	This mitigation does not impact the circuits listed on Table 7-2	10.41	$30,620	339.97	9
Surge Arrestor - Removals	GH-08	Grid Design, Operations and Maintenance	ALLEGHANY 1102CB, HIGHLANDS 1102628, UPPER LAKE 11011276, MIDDLETOWN 110148212	8.85	$3,797	2,330.67	3

Mitigation (Reference Section 2, Table 7-3-1)	Initiative Tracking ID	WMP Category	Circuit Segments Impacted (Reference Table 7-2)	Est. Total Risk Reduction (Risk Buydown)	Estimated Total Cost ($000s)	RSE: (Risk Reduction/ Cost $M)	RSE Rank
Line Sensor - Installations	SA-02	Situational Awareness and Forecasting	OAKHURST 110310140, CLAYTON 221296224, ANTLER 11011384, APPLE HILL 1104CB	6.70	$34,397	194.77	10
System Hardening - Transmission Shunt Splices	GH-06	Grid Design, Operations and Maintenance	This mitigation does not impact the circuits listed on Table 7-2	2.06	17,300	119.08	13
Distribution Line MSO - Replacements	GH-09	Grid Design, Operations and Maintenance	This mitigation does not impact the circuits listed on Table 7-2	1.26	7,580	166.23	12

Please note that not all the mitigations identified in PG&E's list of targets (Table 7-3-2) are included in the table above. The mitigations not included above are listed below with explanations for their exclusion.

- Inspections programs (Targets AI-02, AI-04, AI-05, AI-06, AI-07, AI-08, AI-09, AI-10, VM-01, VM-05, VM-06, VM-07). While inspections have historically been viewed as a control (controls do not reduce risk themselves but maintain the level of risk), PG&E exceeds the compliance requirements by inspecting assets more frequently. The way in which PG&E quantifies this risk reduction is considered "Eyes-on-Risk" and is described in Section 7.2.2.2 of the 2023-2025 WMP.
- EPSS is not included above because it is not tied to a specific WMP Target in Table 7-3-2. PG&E does have an EPSS Objective to update EPSS reliability reports.
- Distribution Protective Devices (GH-07) is associated with EPSS reliability impacts, and PG&E has therefore not quantified risk reduction associated with these impacts.
- Pole Clearing Program (VM-02) is not included because PG&E has not determined the risk reduction for the approximately ten percent of poles where the clearing work exceeds compliance requirements.
- Vegetation Management Quality Verification (VM-08) is not a program designed to directly reduce risk.
- Emergency Preparedness (EP-06) requires PG&E to update documents and is not designed to directly reduce risk.
- Community Engagement Surveys (CO-02) requires PG&E to complete education and outreach surveys and is not designed to directly reduce risk.
- PSPS (PS-06) requires us to provide or replace portable batteries to PG&E customers and is not designed to directly reduce risk.

- PSPS (PS-07) estimates the PSPS impact reduction due to wildfire mitigation programs such as MSO switch replacements and undergrounding. The risk reduction related to these programs are included in the table above.

b. "*WMP-Discovery2023_DR_OEIS_004-Q011Atch01.pdf*" is the 2023-2025 WMP Table 7-4 that has been annotated to show the RSE risk rank provided above. For example, the RSE rank for Non-Exempt Expulsion Fuse Removal is 4 (it has the fourth highest RSE rank). Each time Non-Exempt Expulsion Fuse Removal appears in the annotated table, it is listed as "Non-Exempt Expulsion Fuse Removal (4)."

c. While the 2023-2025 WMP Guidelines did not request an RSE table like the one above, and the Safety Model and Assessment Proceeding (S-MAP) allows PG&E to select mitigations based on factors other than RSE rankings as long as PG&E explains its rationale,[2] PG&E has developed its balanced mitigation portfolio by considering (among other things) both risk reduction and resource optimization – the components of RSE.

   PG&E's approach to managing its wildfire risk is built on an iterative process that starts by identifying risks, evaluating how those risks impact PG&E's systems and the community, responding to risks through mitigation and control programs, and monitoring how well PG&E's risk mitigation and management programs are working. This is an on-going effort, and PG&E adjusts its programs to address changes in risk profile and risk mitigation effectiveness. PG&E's approach is informed by collecting and analyzing meteorological and environmental data and using its wildfire risk models to help develop and implement mitigations that improve the resiliency of its systems. For more details, PG&E discusses its risk methodology and assessment in Section 6.1 of the 2023-2025 WMP.

   PG&E focuses on three key elements in developing its wildfire mitigation portfolio: 1) Identifying and selecting mitigation initiatives based on the greatest amount of risk reduction; 2) Considering geographic specific limitations and other constraints to develop a balanced portfolio of mitigations; and 3) Optimizing resources to maximize risk reduction across the system. PG&E begins developing its list of proposed mitigations by analyzing risk events, risk drivers, and consequences and then identify existing programs or develop new programs to eliminate or minimize each risk, by driver and each of the potential consequences. PG&E describes this effort in more detail in Section 7.1.4.2 of the 2023-2025 WMP.

   Effective wildfire mitigation often requires multiple layers of protection through various mitigations rather than a single mitigation per location. This is evident from Table 7-4 and described in Section 7.1.4.3 of the 2023-2025 WMP. PG&E's Comprehensive Monitoring and Data Collection initiatives provide insight into the changing environmental hazards around its assets and the condition of its equipment and provide continuous monitoring capability. PG&E implements Operational Mitigations that provide on-going risk reduction and influence how PG&E manages the environment around the electric grid. Operational Mitigations are generally short-cycle initiatives that can be deployed quickly. For long-term risk reduction, PG&E designs and implement mitigations to reduce ignition risk by changing how PG&E's grid is constructed and operated.

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[2] Decision (D.) 18-12-014, Row 26.

An example of a situation in which PG&E might choose a mitigation with a lower RSE over other mitigations with higher RSEs is its undergrounding program. While the risk reduction per dollar invested for undergrounding is lower than some other programs (as shown in the table above), its effectiveness and the amount of permanent risk buydown are significantly higher than other risk mitigation programs. The result of undergrounding is much lower residual risk, improved reliability, reducing PSPS and EPSS outages, fewer emergency restoration activities during winter storms, and less need for vegetation management activities. Once a line is undergrounded, PG&E reduces our annual spend on temporary repairs and recurring expenses. For these reasons, undergrounding is PG&E's preferred approach to reduce the most system risk.